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## THE FREEZING OF CAYUGA LAKE IN ITS RELATION TO BIRD LIFE.

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CAYUGA is the largest of seven, nearly parallel lakes which lie in the central portion of New York State. They all extend in a north and south direction, and either directly or indirectly connect at the northern end with Seneca River. Numerous streams are tributary to Cayuga at the south end; the two principal ones are Fall Creek and the Inlet, both of which proved to be important in their relations to bird life, since they furnished open water throughout the period during which the lake was frozen.

The conditions necessary for the complete surface freezing of Cayuga Lake are intensely cold weather, and absolutely quiet atmospheric conditions for a prolonged period. As Cayuga Lake is forty miles long, with a surface area of 66.8 square miles, and situated as it is in a trough between wind-swept hills, it is very seldom indeed that the above conditions prevail for a sufficient length of time to permit the complete closing of the lake. In the present instance, the freezing was preceded by six weeks of extremely cold weather, the temperature dropping as low as sixteen degrees below zero, and the entire period accompanied by high north and northwest winds. Freezing would have occurred earlier than it did except for the continued strong winds. When these abated, the lake froze over entirely during a single night.

There seems to be a tradition that Cayuga Lake closes every twenty years, some basis for which appears in the dates of complete freezing. They are: 1796, 1816, 1836, 1856, 1875, 1884 and 1904. The first two dates are approximated,<sup>1</sup> but for the year 1836 we find records showing the lake to have been covered by a thin coating of ice for a day or two;<sup>2</sup> in 1856 the lake was frozen sufficiently to allow teams to cross.<sup>3</sup> A similar hard freezing occurred in 1875,<sup>4</sup> and in 1884 the lake froze over on February 15, and remained in this state until April 4. I am told by several persons in Ithaca that similar conditions obtained for a short time in 1895, but I am assured on very good authority that at no time was it completely closed, there existing an area of several square miles which remained open. In 1904 the surface froze completely about the middle of February,<sup>5</sup> but remained so for a short time only.

It seems evident that this condition of the lake bears a very important relation to bird life, particularly to those species which depend upon the open water for subsistence. So long as a few square miles or even a smaller area remain open, wherein the birds may feed, the effect of the freezing is lost. For this reason, as far as the birds are concerned, the freezing of 1895 may be eliminated. Again, the duration of the frozen period bears an important relation to the bird life, and it is to be regretted that there are no records of ornithological observations for the extremely long period occurring in 1884.

As previously stated, six weeks of excessive cold preceded the freezing during the winter of 1912. Ice twenty-two to twenty-four inches thick formed in the shallows at both ends of the lake, and as the cold weather continued, the frozen area extended outward little by little. During the afternoon and night of February 10, the wind fell, and the morning of the 11th found Cayuga Lake frozen from end to end. On the 12th I made my first visit to the lake about Ithaca to investigate conditions. The air was alive

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<sup>1</sup> Reed, H. D., & Wright, A. H. "The Vertebrate Fauna of the Cayuga Lake Basin, N. Y." *Proc. Amer. Phil. Soc.* Vol. XLVIII No. 193, 1909, p. 372.

<sup>2</sup> Ithaca Daily Chronicle, Dec. 22, 1846, Vol. 1, No. 140.

<sup>3</sup> Ithaca Weekly Journal, March 12, 1856.

<sup>4</sup> Ithaca Daily Journal, March 3, 1875.

<sup>5</sup> Ithaca Daily Journal, Feb. 16, 1904.



1. CANVAS-BACKS FLYING OVERHEAD.



2. CANVAS-BACKS AT REST.



with ducks; flock followed flock, in one continuous stream, all flying southward. I am told by Mr. Vann that even more went by on the 11th than on the 12th. By the morning of the 13th the southerly migration had almost ceased, but there were great numbers at rest upon the ice, and from this time on dead birds were found regularly. Large numbers of ducks sought the open, flowing spots of Fall Creek and the Inlet. While there was a little open water here, there was no food, and the majority very soon left. At Ludlowville, about seven miles down the eastern shore, there was a single spot where a spring fed into the lake, forming an open area about thirty yards square, which soon became the rendezvous of all the ducks within a radius of many miles.

Here, a successful attempt was made to feed them. A week after the freezing over of the lake, this pool was black with ducks; so great had their numbers become that free movement was out of the question. It seemed as if there was not room for another individual. Gradually, however, this crowd decreased, the stronger ones leaving for the south continually. From February 23 to March 3, there were not more than three hundred there. Five species were represented in this flock: Bluebill, Canvas-back, Golden-eye, Black Duck and Buffle-head. The Black Ducks were the most wary—the Canvas-backs the least so. It was a rare sensation indeed to be surrounded by flying hundreds of wild ducks, wheeling and flapping within fifty feet of one's head.

In the following paragraphs will be discussed the various species of water birds found from February 10 to March 3, within the area between Ludlowville and Ithaca, including the conditions in which the birds were found, the numbers of dead recorded, and any other points observed which may prove of value.

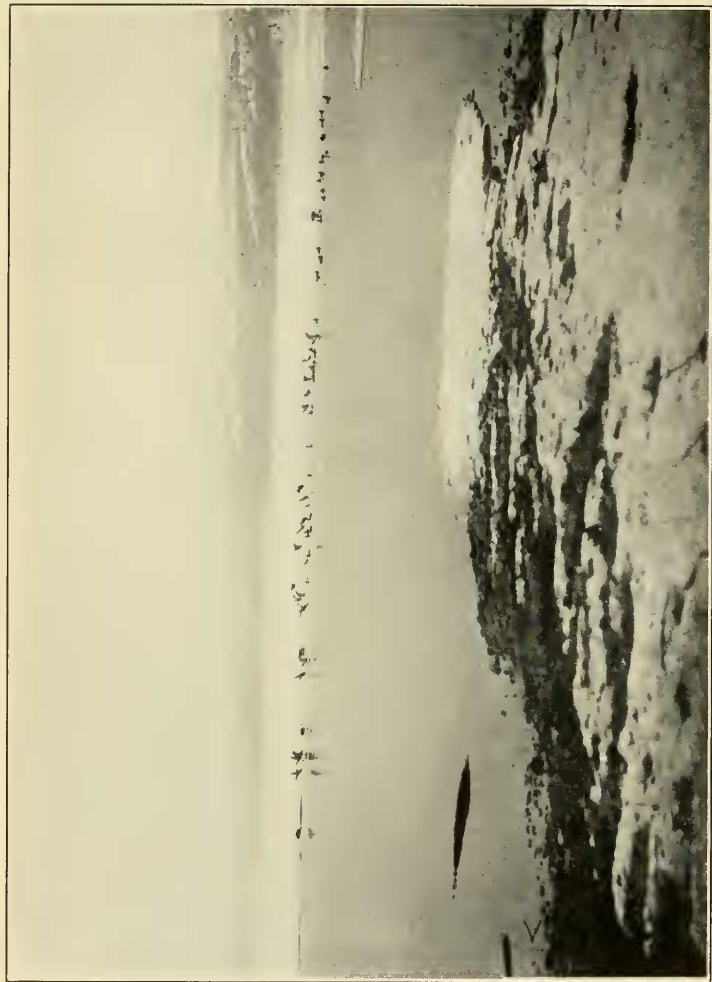
The author gratefully acknowledges the notes and assistance of Professor H. D. Reed, Dr. A. H. Wright, Mr. L. A. Fuertes and Mr. John Vann, as well as the hearty co-operation of Mr. H. H. Knight, with whom many of the accompanying photographs were taken.

1. *Colymbus holboelli*. HOLBOELL'S GREBE.—The freezing of Cayuga Lake offered a rare opportunity for a study of this most interesting and apparently little known bird. Until the present time, the Holboell's Grebe has been considered only a rare visitant at the southern end of the

lake,<sup>1</sup> one or two being recorded almost every winter. It has proved, however, to be the predominant grebe during this winter, twenty-eight individuals having been taken. The reason of its unprecedented abundance here is undoubtedly to be found in the six weeks of extremely cold weather, and the consequent closure of waters in other regions. The sudden closing of the lake's surface in one night left these birds in an absolutely helpless condition, since open water is a necessity for taking flight in this group of birds, Holboell's Grebe being no exception to the rule. As a result, eleven beautiful specimens were picked up alive from the ice in perfectly good physical condition. If approached while sitting on the ice, these birds made no attempt to escape. They would strike at the outstretched hand, and would emit calls very loon-like in general quality. Once the bird alights upon the ice, it is unable to take flight, and must await starvation or other tragic end. At best, all it can do is to flap its wings and possibly scrape along over the ice for a few feet. The position of the legs, together with the smooth surface of the ice, rendered these efforts at locomotion entirely futile. The best opportunity of observing this bird occurred in a little piece of open water in Fall Creek, below Ithaca Falls. This hole was about twenty-five feet square, shallow at one end and deep at the other, surrounded on three sides by thin ice, and on the fourth by ice sufficiently strong to afford good footing. The bird had apparently alighted in the pool, and even here there was insufficient open water for taking flight again, and it was therefore possible to study the actions of this bird at very close range. When approached, the bird dove, and remained under water nearly a minute. As soon as it came up, it would dive again on the instant so long as the observer remained near. The water was clear, and the bird could be seen plainly, shooting and zigzagging about, midway between the surface and the bottom. While swimming under water, the neck is extended to its utmost, and both legs and wings are used. With neck outstretched, the bird offers the least possible resistance to the water, there being a smooth and gradual transition from the tip of the slender bill to the middle of the back, the widest part of the body. The speed which is developed under water is marvelous, at times it being almost impossible to follow its movements, which were so rapid that the bird appeared more like a large, gray fish darting about. When coming to the surface, the bill and head appeared slowly, when a glimpse of the observer caused it to dive again. In diving, even though the body was under water, the bill went down first, so that it really dove instead of sinking quietly. After having been under water almost continually for over fifteen minutes, the bird was tired out, and finally came to the surface on the opposite side of the pond from the observer. Here, it drifted nervously about, giving its peculiar squawking note every few seconds. After being watched for some time, it was driven into the

<sup>1</sup> Reed & Wright. *The Vertebrate Fauna of the Cayuga Lake Basin*, N. Y., p. 409.





CANVAS-BACKS RISING.